ACC NR: AP7001703 SOURCE CODE: UR/0032/66/032/012/1523/1525

AUTHOR: Kogan, M. G.; Andreychenko, I. T.; Bogin, V. S.; Zavartsev, N. A.; Karker, Ya. I.

ORG: none

TITLE: Laboratory high-temperature furnace for heating and melting of metals

SOURCE: Zavodskaya laboratoriya, v. 32, no. 12, 1966, 1523-1525

TOPIC TAGS: metalluric research, metallurgic furnace, high temperature furnace, electron beam furnace

ABSTRACT: A laboratory vacuum furnace for heating, melting, zone refining, and evaporating (for vacuum-vapor deposition) primarily refractory metals has been designed and built at an unidentified institution. The furnace operates with several heating systems (resistance, radiation, arc, and electron beam) used individually or in combination. The vacuum chamber can be evacuated to a pressure of 10^{-6} mm Hg. The furnace produces ingots 50 mm in diameter and up to 400 mm long. The charge can be placed in advance or fed during the melting. Zone refining can be done with a metal bar in the horizontal or vertical position. In vacuum-vapor deposition, the evaporation is done with an electron beam, and the temperature of the substrate is controlled with radiant heat. The furnace has two 45-kw electron guns operating with an accelerating voltage of 30 kv. Orig. art. has: 1 figure.

SUB CODE: 13/ SUBM DATE: none/ ATD PRESS: 5111

Card 1/1 UDC: 621.365:621.52:546.3

KOGAN, M.G., student

Analyzing two variants of the Talcott method issuing from the theory of the astronomical universal. Trudy MIIGAIK no.44:97-100 '61. (MIRA 14:7)

1. Moskovskiy institut inzhenerov geodezii, aerofotos"yemki i kartografii, kafedra astronomii.
(Latitude)

L 32161-66 EWT(1) GW

ACC NR: AP6010065 (N) SOURCE CODE: UR/0387/66/000/003/0063/0073

AUTHOR: Kuzivanov, V. A.; Kogan, M. G.; Magnitskaya, Ye. I. 37 B

ORG: Institute of Physics of the Earth, Academy of Sciences, SSSR (Institut fiziki Zemli, Akademii nauk SSSR)

TITLE: The effect of horizontal and vertical acceleration on the readings of a strongly damped gravimeter 12

SOURCE: AN SSSR. Izvestiya. Fizika Zemli, no. 3, 1966, 63-73

TOPIC TAGS: gyrostabilized platform, ~~accelerometer,~~ gravimeter, ACCELERATION EFFECT

ABSTRACT: A study was made of the effect of horizontal and vertical accelerations on the readings of a pendulum-type gravity meter, mounted on an ideal gyrostabilized platform in an ideal universal joint. The resulting cross-coupling effect was analyzed theoretically, the parameters being related by the differential equation:

$$\ddot{\varepsilon} + 2\lambda\dot{\varepsilon} + \left(n^2 + \dot{\gamma}^2 - \frac{\ddot{X}}{l}\right)\varepsilon = + \frac{g_r}{l} + \frac{\ddot{Z}}{l},$$

where ε is the angle of deviation of the pendulum from the horizontal, $\ddot{X}$ is the hori-

UDC: 550.831

Card 1/2

L 32161-66

ACC NR: AP6010065

zontal acceleration, n is the natural frequency of the pendulum gravimeter, λ is the damping characteristic, l is the reduced pendulum length and γ is the angular velocity of the support along the Z axis. A solution of this equation was derived of the form

$$\varepsilon = \varepsilon_0 + \delta\varepsilon_0,$$

where ε_0 is the solution of the 'abridged' equation:

$$2\lambda\dot{\varepsilon}_0 + \left(n^2 - \frac{\ddot{X}}{l} + \dot{\gamma}^2\right)\varepsilon_0 = + \frac{g_r}{l} + \frac{\ddot{Z}}{l}.$$

The solution of ε_0 was an expanded integral equation while that of ε was an infinite trigonometric series. The magnitude of the cross-coupling effect was estimated by inserting numerical values for the above parameters and variables; for $\ddot{X} \approx \ddot{Z} \approx 50$ gal this effect reached 50 mgl and higher. The orbital acceleration was calculated at 125 mgal for $\ddot{X}=\ddot{Z}=50$ gal and $\omega=1$ sec^{-1}. Formulas were also derived for the changes in gravitational field with time using the same parameters. Numerically, this was calculated to be 1.4 mgl for $\partial g/\partial x$ = 10 mgl/mile, n^2=100 sec^{-2} and 2λ=5000 sec^{-1}. Orig. art. has: 1 table, 63 formulas.

SUB CODE: 08/ SUBM DATE: 19Feb65/ ORIG REF: 003/ OTH REF: 001

Card 2/2

SORKIN, M.M.; GAVRILOVA, G.Ye.; MEZHUYEVA, Ye.A.; KOGAN, M.G.

Causes of dark-colored ammonium sulfate in by-product coke plants. Koks i khim. no.1:55-56 '56. (MLRA 9:5)

1. Bagleyskiy koksokhimicheskiy zavod.
(Ammonium sulfate)

AYVENKO, D.D.; PEDAN, A.A.; KOGAN, M.G.

Operations of the ammonia-lime section employing an external saturator and decanter. Koks i khim. no.2:30-32 '61. (MIRA 14:2)

1. Bagleyskiy koksokhimicheskiy zavod.
(Dneprodzerzhinsk—Coke industry—By-products) (Ammonia)

SORKIN, M.M.; PEDAN, A.A.; KOGAN, M.G.

Recovery of benzene hydrocarbons from tar acid and the removal of the residue with the water of hydrosol removers. Koks i khim. no. 3:49-50 '61. (MIRA 14:4)

1. Bagleyskiy koksokhimicheskiy zavod.
(Dneprodzerzhinsk—Coke industry—By-products)
(Coal tar products)

CHEN, N.G.; SORKIN, M.M.; PEDAN, A.A.; KOGAN, M.G.

Investigating the various methods of controlling scale formation and corrosion of metals. Koks i khim. no.1:46-51 '63. (MIRA 16:2)

1. Dneprodzerzhinskiy metallurgicheskiy zavod-vtuz (for Chen).
2. Bagleyskiy koksokhimicheskiy zavod (for Sorkin, Pedan, Kogan).
(Feed water purification) (Corrosion and anticorrosives)

S/068/63/000/001/003/004
E071/E136

AUTHORS: Chen, N.G., Sorkin, M.M., Pedan, A.A., and Kogan, M.G.

TITLE: An investigation of various methods of combating the scale formation and corrosion of metal

PERIODICAL: Koks i khimiya, no.1, 1963, 46-57

TEXT: A comparative investigation of the effect of magnetic, phosphate and "coking works" methods of treatment of water used for cooling in heat exchangers was carried out in a laboratory. The "coking works" method of treatment of cooling water consists of adding to it the works phenolic effluent. This method was the most effective in preventing scale formation. The magnetic treatment decreases the corrosive action of the water only insignificantly. Moreover, an intense corrosion of metal was noticed in the sector of direct action of the magnetic field. Sodium phosphate in a concentration of 2 mg/litre (calc. as P_2O_5) does not inhibit corrosion, but in a mixture with calcium bicarbonate (10 mg - equiv/litre) has a protective influence. Phenolic water from the coking works has a particularly strong

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An investigation of various ... S/068/63/000/001/003/004
E071/E136

passivating effect on metal if it contains some creosote oil. The presence of a large amount of tar in the water leads to the activation of metal.

There are 2 figures and 2 tables.

ASSOCIATION: Dneprodzerzhinskiy metallurgicheskiy zavod-vtuz (Dneprodzerzhinsk Metallurgical Works - vtuz) (Chen, N.G.); Bagleyskiy koksokhimicheskiy zavod (Bagley Coking Works) (Sorkin, M.M., Pedan, A.A. and Kogan, M.G.).

Card 2/2

KOGAN, M.I., translator.

New loom using knitting mechanisms ("Skinner's Silk and Rayon Record" no. 2, 1956). Tekst.prom. 16 no.6:60-62 Je '56. (MLRA 9:8)
(Great Britain--Looms)

KOGAN, M. I.

ZALESSKIY, A.M., professor; KOGAN, M.I., inzhener; PTICHKIN, P.N., inzhener; TAYTSEL', G.B., inzhener.

Series of small-size support insulators for inside installation. Vest.elektroprom. 27 no.12:31-33 D '56. (MIRA 10:1)

1. Leningradskiy politekhnicheskiy institut.
(Electric insulators and insulation)

VAYNSHTEYN, Georgiy Mikhaylovich; Prinimali uchastiye: KOGAN, M.I. [translator]; PETUKHOV, V.P. [translator]. SLOBODKINA, G.N., red.; VELITSYN, B.L., tekhn.red.

[Pneumatic-tube transportation of concrete] Transportirovanie betonnoi smesi po trubam pri pomoshchi szhatogo vozdukha. Moskva, Orgenergostroi, 1957. 23 p. (MIRA 12:3)
(Pneumatic-tube transportation) (Concrete)

KOGAN, M.I.; AZAROVA, A.Kh.

Isolation and analysis of vegetable oil fractions enriched with tocopherols obtained by molecular distillation. Trudy VNIVI 6: 64-74 '59. (MIRA 13:7)

1. Vsesoyuznyy nauchno-issledovatel'skiy vitaminnyy institut. Fiziko-tekhnologicheskaya laboratoriya.
(OILS AND FATS)

ZHURAVSKIY, L.M.; KOGAN, M.I.

Plastic components for textile machinery. Tekst.prom. 20 no.2:28-32 F '60. (MIRA 13:6)

1. Ispolnyayushchiy obyazannosti glavnogo konstruktora zavoda Tashtekstil'mash (for Zhuravskiy). 2. Nachal'nik tekhnologicheskogo otdela Spetsial'nogo konstruktorskogo byuro tekstil'nogo mashinostroyeniya (for Kogan).
(Plastics) (Textile machinery)

SPANGENBERG, Ye.P.; ENDEL'MAN, G.N., red.; KOGAN, M.I., red.; GRECHANINOVA, A.A., tekhn.red.

[A naturalist's notes] Zapiski naturalista. Moskva, Izd-vo Mosk. ob-va ispytatelei prirody. Book 1. 1950. 234 p. (Sredi prirody, no.25). Book 2. 1951. 243 p. (Sredi prirody no.33). (MIRA 15:7)

(Animals, Habits and behavior of)

KOGAN, M.I.

PAKHUL'SKIY, A.I.; GLADKOV, N.A., red.; KOGAN, M.I., red.

[Ichthyophagous birds in the southern seas of the U.S.S.R. and their harmfulness] Ryboiadnye ptitsy iuzhnykh morei SSSR i ikh vred. Moskva, Izd-vo Mosk. ob-va ispytatelei prirody, 1951. 92 p. (Materialy k poznaniiu fauny i flory SSSR. Otdel zoologicheskii, no.30).
(Birds--Food) (Fisheries) (MIRA 11:3)

KOGAN, M.I.

GRECHKIN, V.P.; BUKHOENYM, A.N., nauchnyy red.; KOGAN, M.I., prof., vedushchiy red.

[Studies on the biology of forest pests] Ocherki po biologii vrediteleí lesa. Moskva, Izd-vo Mosk. ob-va ispytatelei prirody, 1951. 149 p. (Materialy k poznaniiu fauny i flory SSSR. Otdel zoologicheskii, no.31). (MIRA 11:3)

(Forest insects)

KOGAN, M. I.

GROSSGEYM, Aleksandr Al'fonsovich [deceased]; TAKHTADZHYAN, A.L., red.; KOGAN, M.I., red.; GRECHANINOVA, A.A., tekhn.red.

[Plant resources of the Caucasus] Rastitel'nye bogatstva Kavkaza. 2-oe, posmertnoe izd. pod obshchei red. A.L.Takhtadzhiana. Moskva, Izd. Mosk. ob-va ispytatelei prirody, 1952. 631 p. (Materialy k poznaniiu fauny i flory SSSR, izdavaemye Moskovskim obshchestvom ispytatelei prirody. Novaia seriia, otdel boranicheskii. no.7 (XV))
(MIRA 11:2)

1. Chlen-korrespondent Akademii nauk Armyanskoy SSR (for Takhtadzhyan)
(Caucasus--Botany, Economic)

S/081/62/000/016/022/043
B168/B186

AUTHORS: Fedorova, R. V., Kogan, M. I., Belova, O. D.

TITLE: Vapor-phase condensation of acetone with formaldehyde in methylvinylketone. Summary

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 16, 1962, 384, abstract 16L11 (Tr. Vses. n.-i. vitamin. in-t, v. 7, 1961, 54-59)

TEXT: The authors studied the production of methylvinylketone (I) by condensation of industrial formalin (II) and chemically pure acetone (III). This was achieved by a vapor-phase reaction on higher oxides of rare earths, acid clays (e.g. gumbrin, kill) and industrial catalysts (e.g. Cd-Ca phosphate, Ca phosphate), performed, in a flow type latoratory apparatus at from 280 to 450-500°C (< 400°C preferable) at volume velocities from 100 to 1000-2000 l gaseous III per 1 l catalyst per hour, with 45-50 ml catalyst and a molar ratio of II : III = 1 : 1. The composition of the reaction mixture was determined analytically (e.g. I by Kaufman's method, II by reaction with dimedon, etc.), and that of gaseous products with a ВТИ-2 (VTI-2) gas analyser. Catalysts are listed, and the

Card 1/2

Vapor-phase condensation of... S/081/62/000/016/022/043
B168/B186

following respective values are given for optimum reaction temperature in °C, yield of I per throughput of III in %, yield of I per input of I into the reaction in %, productivity in g per 1 l catalyst per hr : Ca phosphate, 420, 26.6, 93.7, 306; higher oxides of rare earths, 375-380, 36, 100, 325; higher oxides of rare earths on a carrier, 515, -, ~100, 565; silica gel, promoted with KOH, -, 39.1, ~100, 22. Graphs are given for productivity of I depending on temperature, catalyst and volume velocity. [Abstracter's note: Complete translation.]

Card 2/2

Transmission of ultrason...

... ultrasonic energy ...

KOGAN, M.I.

Alcoholysis of glycerides as a method of purifying and enriching concentrates with vitamins A and E obtained by molecular distillation. Trudy VNIVI 6:82-87 '59. (MIRA 13:7)

1. Vsesoyuznyy nauchno-issledovatel'skiy vitaminnyy institut. Apparaturno-mekhanicheskaya laboratoriya.
(VITAMINS) (GLYCERIDES)

KOGAN, M.I. [deceased]; BELYAKOVA, M.S.; SAVOST'YANOV, G.I.; KOGAN, R.M.; RADETSKAYA, N.V.

Biochemical oxidation of d-sorbite in l-sorbose in a continuous disc-column fermenter. Trudy VNIVI 8:22-35 '61. (MIRA 14:9)
(Sorbitol) (Sorbose)

KOGAN M.K. and VISHNIAKOV A.P.

6197. Vishniakov A.P. and Kogan M.K. Leningrad Complete analytical method forr iron in blood Klinicheskaya Meditsina, Moscow 1950, 28/1 (88-90) Tables 2

Two ml of blood are charred, heated to redness, cooled, moistened with two drops of a mixture of equal parts of sulphuric and nitric acids and heated again until the residue becomes white. After cooling a drop or two of concentrated sulphuric acid is added and the whole gently heated to expel any nitrous vapors. After cooling the residue is dissolved in 20 ml. of diluted sulphuric acid (1 : 20) and filtered over a column of metallic cadmium. The crucible and column are washed with distilled water, filtrate and washings are combined, 1 ml. of sulphuric acid is added and the mixture titrated with 0.01 n-$KMnO_4$. The reproducibility of the result may be checked by a second titration of the same mixture after reduction with cadmium.

Fuks - Zagreb

SO: Excerpta Medica - Section II Vol. III No. 11

Sci. Inst. Blood Transfusion, Leningrad

ROTFEL'D, L.S., kand.biol.nauk; ALEKSANDOVA, N.M., nauchnyy sotrudnik; KOGAN, M.K., nauchnyy sotrudnik

Biochemical investigation of the bone marrow and peripheral blood in blood diseases. Akt.vop.perel.krovi no.4:226-228 '55.

(MIRA 13:1)

1. Biokhimicheskaya laboratoriya Leningradskogo instituta perelivaniya krovi (zav. laboratoriyey - prof. N.N. Blokhin).
(BLOOD--EXAMINATION) (MARROW)

Determinations were made of total nitrogen, dry residue and mineral matter in the bone marrow and peripheral blood of healthy people and those afflicted with diseases of the blood system. In hypochromic anemia the dry residue and mineral matter were decreased in the punctate of the sternum and in peripheral blood, while total nitrogen was decreased in bone marrow. Polycythemia exhibited a disturbed ratio between total nitrogen in bone marrow and blood serum (total nitrogen was always less in bone marrow than in serum), an increase of the dry residue and mineral matter in the bone marrow, and an increase of the dry residue in the peripheral blood, while leukemia showed great fluctuation of total nitrogen content in the ~~ppm~~ punctate.

KOGAN, M.K., nauchnyy sotrudnik; FREYDZON, V.A., nauchnyy sotrudnik

Change of the iron content in and the catalase activity of the blood in some blood system diseases. Akt.vop.perel.krovi no.6:126-132 '58. (MIRA 13:1)

1. Biokhimicheskaya laboratoriya (zav. laboratoriyey - doktor biol. nauk I.F. Seyts) i gematologicheskaya klinika (zav. klinikoy - prof. S.I. Sherman) Leningradskogo instituta perelivaniya krovi.
(IRON IN THE BODY) (CATALASE) (BLOOD--DISEASES)

L 44346-66 EWT(d)/EWP(1) IJP(c) BB/GG

ACC NR: AP6026946 SOURCE CODE: UR/0115/66/000/007/0033/0038

AUTHOR: Tartakovskiy, V. I.; Kogan, M. L.

43
B

ORG: none

TITLE: Angle-to-voltage linear converter with an error of 0.001%

SOURCE: Izmeritel'naya tekhnika, no. 7, 1966, 33-38

TOPIC TAGS: electromechanical converter, angle to voltage converter, linear converter, analog computer, computer component

ABSTRACT: An electromechanical device is proposed whose output voltage (proportional to the input-shaft angle) is made up of three decimal-place voltages. The higher-place voltage is obtained from a 20-tap, 10-v, 1000-cps toroidal-core autotransformer via a shaft-driven 2-brush, 20-contact switch. The mid-place voltage, from a 24-tap toroidal-core transformer via a 2-brush, 24-contact switch. The lower-place voltage is supplied by two 90°-spaced rotary transformers driven by the same shaft; these transformers perform the interpolation in the mid-place voltage steps. Thus, the input shaft drives two sets of brushes and two rotary transformers. The linearity error in an experimental model is claimed to be 0.001%; the noise (quadrature and higher-harmonic voltages) error, 0.0025%. The converter is intended for analog computing devices, angle-transmission systems, and tool-feed systems of metal-working machines. Orig. art. has: 3 figures and 6 formulas. [03]

SUB CODE: 09 /SUBM DATE: none / ORIG REF: 003 / OTH REF: 001

UDC: 681.142.332.1

Card 1/1 blg

KOGAN, M.L.

Semi-uniflow turbines. Biul.tekh.-ekon.inform. no.5:25-27 '58.
(MIRA 11:7)

(Hydraulic turbines)

KOGAN, Mikhail L'vovich

[Budget law of the Union Republics] Biudzhetnye prava Soiusnykh Respublik. Moskva, Gos.izd-vo iurid.lit-ry, 1960. 131 p. (MIRA 14:2)

(Budget)

TARTAKOVSKIY, V.I.; ETKIN, A.A.; KOGAN, M.L.; SHPRINTSEN, G.I.

Analog position system of program control for boring and turning lathes. Stan. i instr. 36 no.4:18-20 Ap '65. (MIRA 18:5)

KOGAN, M.M.; MEDONOS, S. (translator)

A turbogenerator for nuclear power stations. Jaderna energie 3 no.8:245-248 Ag '57

M.

KOGAN, M., kandidat tekhnicheskikh nauk, starchiy nauchnyy sotrudnik.

Certain problems in municipal heat supply. Zhil.-kom.khoz. 3 no.7:10-11 Jl '53. (MLRA 6:8)

1. Akademiya kommunal'nogo khozyaystva imeni K.D.Pamfilova.
(Heating from central stations)

KOGAN, M.M.

AID P - 2558

Subject : USSR/Engineering

Card 1/1 Pub. 110-a - 10/13

Author : Kogan, M. M., Kand. Tech. Sci.

Title : Problems of heat supply for small and medium size cities

Periodical : Teploenergetika, 6, 45-49, Je 1955

Abstract : The author discusses possibilities for the development and improvement of the district heating systems. A detailed analysis of utilization of existing urban electric power plants is presented. The problem of efficient regional heating and types of turbines to be used is discussed. Initial and final steam characteristics are given. Five diagrams.

Institution: Academy of Municipal Services

Submitted : No date

KOGAN, Mikhail Mironovich, kandidat tekhnicheskikh nauk; VINOKUROVA, Ye., redaktor; FOMBERG, P., tekhnicheskiy redaktor.

[Electric heating of small and medium sized cities] Teplofikatsiia malykh i srednikh gorodov. Moskva, Izd-vo Ministerstva kommunal'nogo khoziaistva RSFSR, 1956. 83 p. (MLRA 9:5)
(Heating from central stations)

KOGAN, M. M.

Development and modernization of existing steam turbine electric power stations. Zhil.-kom.khoz. 6 no.7:6-9 '56. (MLRA 10:2)

1. Starshiy nauchnyy sotrudnik Akademii kommunal'nogo khozyaystva.
(Electric power plants)

AUTHOR KOGAN, M.M. 84-5-3/22

TITLE A Type of A Turbogenerator for Atomic Power Plants (Tip turbogeneratora dlya atomnykh elektrostantsiy -Russian)

PERIODICAL Atomnaia Energiia, 1957, Vol 2, Nr 5, pp 421-426 (U.S.S.R.)
Received 6/1957 Reviewed 7/1957

ABSTRACT For the purpose of warranting an even load of atomic condensation electric power plants both in summer and in winter it is useful for the turbines and generators in winter to work with an overload of about 5%. Condensation turbines and -generatores of the usual type are able bstand such an overload, so that no special types of turbogenerators are necessary. For thermoelectric centers the selection of the type of turbogenerators is more complicated. The selection of the optimum value of α_{TheZ} (this apparently denotes the degreeof utilization of the maximum thermal load of the turbines of a thermoelectric center depends upon several factors and especially upon the working coefficient of the system of energy. For most of the thermoelectric centers the optimum values of α_{TheZ} are near 0,5. The optimum value of α_{TheZ} has to be higher for atomic power plants, must, however, stay below the value of 1. The optimum value of α_{TheZ} may be assumed at 0,8. All further deliberations refer to the values α_{TheT} = 0,8, they are, however, also valid for the other values of the thermification coefficient. The problem of the optimum vapor parameter for atomic electricity plants has not yet been definitely solved, and therefore further investigation follows for various initial parameters of the steam: low: 15 at 250°C medium: 35 ata, 435°C, high: 90 ata, 500°C. When using turbines having a

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constant steam consumption the yield of electric energy (in comparison to the usual thermofication-turbines) increases for the above mentioned parameters by 43, 32 and 24% respectively. On the occasion of the transition to such turbines with constant steam consumption the demand of capital increases only little and the expenses for personnel do not change at all. The joint use of turbines with constant steam consumption and of turbines with back pressure warrants the most suitable total efficiency of an atomic thermoelectric center and of a common thermal power plant. It is advisable to erect atomic power plants essentially as thermoelectric centers, by using turbogenerators with condensation. Passage of steam through the high pressure cylinder and through the low pressure cylinder respectively should be constant or variable respectively. (With 5 illustrations and 1 table)

ASSOCIATION
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SUBMITTED 20.10.1956
AVAILABLE Library of Congress
Card 2/2

9(4) SOV/112-58-3-4679

Translation from: Referativnyy zhurnal. Elektrotekhnika, 1958, Nr 3, p 188 (USSR)

AUTHOR: Kogan, M. M., and Myshanskiy, Yu. V.

TITLE: Magnetic-Field Control of Phanotron Functioning in a Relaxation Circuit (Upravleniye rabotoy gazotrona v relaksatsionnoy tsepi s pomoshch'yu magnitnogo polya)

PERIODICAL: Tr. Odessk. elektrotekhn. in-ta svyazi, 1957, Nr 5 (15), pp 97-108

ABSTRACT: The staged experiments show that an external transverse magnetic field, within a certain flux-density range depending on the source voltage, materially increases the discharge-current effective value and the relaxation-oscillation amplitude; it also tends to decrease the oscillation frequency. An external longitudinal magnetic field results in stabilization of relaxation oscillations and in a certain increase in their amplitude. The authors explain the phenomena in terms of variation of parameters of the discharge gap during the conduction time; in case of the transverse field, anode current increases

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9(4) SOV/112-58-3-4679

Magnetic-Field Control of Phanotron Functioning in a Relaxation Circuit

due to additional ionization by cycloidal electron motion; in case of the longitudinal field, a coordination of ionic stream motion takes place. Soviet abstractor's note: The increase in current and decrease in frequency could be explained simply by increased firing voltage of the phanotron in the magnetic field.

F.M.Ya.

Card 2/2

KOGAN, M.M.

KOGAN, M.M., inzh.; GRISHCHENKO, S.S., inzh.

Conference on problems of shipbuilding technology. Sudostroenie 23 no.8:71-72 Ag '57. (MIRA 10:11)
(Shipbuilding)

KOGAN, [illegible]

"Certain Characteristics of Spatial Supersonic Flows," by [illegible] Kogan, Prikladnaya Matematika i Mekhanika, Vol 100, No 5, Sep/Oct 56, pp 661-662

The author discusses the behavior of a laminar gas flow over a wing-like surface at supersonic speeds. He presents two formulas with their proof and the conclusions derived from them for analyzing the angle of attack, the influence of ailerons, and the lift ability of a supersonic wing having special leading and trailing edges.

The author's only reference is made to his own work titled "Certain Integral Characteristics of Supersonic Flows," Trudy TsAGI, No 687, 1955.

[Comment: From the similarity in titles it is believed that the article is a condensation of the author's other work which, according to his citation, appeared in Trudy TsAGI, a publication not known to be available outside the Soviet Orbit.]

Sum 1219

KOGAN, M.N.

40-21-2-8/22

AUTHOR: Kogan, M.N. (Moscow)

TITLE: On Bodies of Minimal Resistance in a Supersonic Gas Flow (O telakh minimal'nogo soprotivleniya v sverkhzvukovom potoke gaza)

PERIODICAL: Prikladnaya Matematika i Mekhanika, 1957, Vol 21, Nr 2, Mr.-Ap. pp 207-212 (USSR)

ABSTRACT: In connection with the linear theory the author considers the bodies and wings of minimal resistance. It is shown that in a supersonic flow there exist surfaces with the following property: On these surfaces the forces which act on the bodies being in the interior of these surfaces and the condition for the reservation of the mass can be expressed by the values of the velocity potential. This assertion permits to reduce the considered extremal problem to a plane problem. An example is considered which is analogous to the classical problem of Munk on wings in an incompressible fluid. A further simple example is computed. In all cases the author restricts himself to the calculation of the forces which act on bodies of minimal resistance; the determination of the form of body which causes these forces is not made. It is only stated that

Card 1/2

On Bodies of Minimal Resistance in a Supersonic Gas Flow 40-21-2-8/22

this problem is very difficult and that it demands the solution of the three-dimensional Goursat's problem. There are 3 references, 2 of which are Soviet, and 1 German.

SUBMITTED: August 1, 1956

AVAILABLE: Library of Congress

1. Wings—Supersonic gas flow—Theory

Card 2/2

10(2)
AUTHOR: Kogan, M.N. (Moscow) SOV/40-22-4-1/26

TITLE: On the Equations of Motion of Rarefied Gases (Ob uravneniyakh dvizheniya razrezhennogo gaza)

PERIODICAL: Prikladnaya matematika i mekhanika, 1958, Vol 22, Nr 4, Jl.-Ag. pp 425 - 432 (USSR)

ABSTRACT: The Navier-Stokes equations applied in aerodynamics are valid rigorously for such flows only, the characteristic longitudinal dimensions of which are large compared with the mean free length of path of the molecules. For strongly rarefied gases or for flows around obstacles with extremely small measurements the flowing medium must not at all be treated as a continuous spectrum. For the investigation of motion of rarefied gases the kinetic gas theory applies the distribution function of the velocities in a certain volume. This distribution function is normalized so that its integral over a certain volume represents the number of the molecules which move with a certain velocity. Thus it is possible to express the hydrodynamic magnitudes density, mean molecular velocity, temperature, pressure by the distribution function. The stress tensor and also the vector of the energy flow in the flow then result as moments of the

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distribution function. The distribution function itself has to satisfy the Boltzmann equation. This very complicated equation is simplified in the present paper so that it is possible to calculate from it the distribution function in arbitrary approximation. According to the method given by the author also the remaining term of the applied series expansion can be calculated in every concrete case and thus the error of the approximative calculation for weakly rarefied gases can be determined. The Boltzmann equation simplified by the author has the form :

$$\frac{df}{dt} = \frac{\partial f}{\partial t} + \xi_i \frac{\partial f}{\partial x_i} = An(f_o - f) \qquad (2.7)$$

Here f is the distribution function, n the number of the molecules in the unit volume, A a constant depending on the kind of the investigated molecules.
The given reduced Boltzmann equation is applied to the investigation of motions of weakly rarefied gases, and some considerations concerning the motions of strongly rarefied gases are made. Since in the motions of strongly rarefied

On the Equations of Motion of Rarefied Gases SOV/40-22-4-1/26

gases the impacts of the molecules have an unessential influence only, therefore it may be supposed that the neglects made in the deduction of the reduced Boltzmann equation are admissible. In any case, however, the simplified Boltzmann equation can be understood to be a mathematical model of the exact Boltzmann equation, and one can study on it the behavior of the distribution function.

There are 4 figures, and 5 non-Soviet references, all of which are English.

SUBMITTED: May 28, 1957

Card 3/3

KOGAN, M.N. (Moskva)

Magnetohydrodynamics of plane axisymmetric gas flows of infinite electric conductivity. Prikl. mat. i mekh. 23 no.1:70-80 Ja-F '59. (MIRA 12:2)

(Magnetohydrodynamics)

KOGAN, M.N. (Moskva)

Shock waves in magnetohydrodynamics. Prikl. mat. i mekh. 23 no.3:557-563 My-Je '59. (MIRA 12:5)
(Shock waves) (Magnetohydrodynamics)

SOV/20-128-3-15/58

10(7), 24(8)

AUTHOR: Kogan, M. N.

TITLE: On Flows of High Thermal Conductivity

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 128, Nr 3, pp 488-490 (USSR)

ABSTRACT: Thermal conductivity of ionized gas rapidly increases due to the high mobility of electrons. Hence, Prandtl number Pr of such gases can attain values of $\sim 10^{-2}$ (with liquid metals, Prandtl number is of the order 10^{-3}). In a plasma of high temperature, conductivity rises also due to radiations. This article deals with some characteristic kinds of flows occurring at high conductivity of the gas. Part I is devoted to the thermal boundary layer. For steady gas flow, the equation of thermal conductivity reads (in the usual denotation):

$$c_p \varrho \left(u \frac{\partial T}{\partial x} + v \frac{\partial T}{\partial y}\right) = u \frac{\partial p}{\partial x} + v \frac{\partial p}{\partial y} + \frac{\partial}{\partial x}\left(k \frac{\partial T}{\partial x}\right) + \frac{\partial}{\partial y}\left(k \frac{\partial T}{\partial y}\right) + \mu \left\{\left(\frac{\partial u}{\partial y}\right)^2 + \dots\right\}$$

When Pr is small and Reynolds number so great that also Peclet number

$$Pe = \frac{\varrho u L}{k/c_p}$$

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is much greater than 1, the boundary layer resulting from the flow of gas about a plane plate may be subdivided into two boundary layers: into a viscous one with a thickness of $\delta_\mu = L/\sqrt{Re}$, and a thermal one with a thickness of $\delta_k = L/\sqrt{Pe}$, where $\delta_\mu \ll \delta_k$ holds. The temperature transverse to the viscous layer may be regarded as constant and equal to the wall temperature. The effect of viscosity may be neglected in the thermal layer. The flows in the thermal layer are defined by the equations $\frac{\partial \varrho u}{\partial x} + \frac{\partial \varrho v}{\partial y} = 0$, $\varrho u \frac{\partial u}{\partial x} + \varrho v \frac{\partial u}{\partial y} = - \frac{\partial p}{\partial x}$,

$c_p \varrho \left(u \frac{\partial T}{\partial x} + v \frac{\partial T}{\partial y}\right) = u \frac{\partial p}{\partial x} + \frac{\partial}{\partial y}\left(k \frac{\partial T}{\partial y}\right)$. The boundary conditions $u \to u_\infty(x)$, $T \to T_\infty(x)$ at $y \to \infty$, and $v = 0$, $T = T_w(x)$ at $y = 0$ are added to this set. The solution of this set determines the velocity at the boundary of the viscous boundary layer $u(x;0)$, which is required for a calculation of the viscous flow (at a density which is a given function of p and T_w). The author solves the simplest problem for the constants p, u_∞, T_∞ and T_w. He further determines the heat transfer to the wall, taking kinetic heating in a viscous layer into account. At the ratio of thermal conductivity to viscosity under investigation, the flow in the viscous layer may be considered isothermal and, consequently, also incompressible. On the other hand, heat is emitted when the gas in the viscous layer is slowed down, which is then transferred to the wall and thermal layer. The total amount of heat emitted per unit of length of the viscous layer is

$q = -\frac{1}{2}\frac{d}{dx}\int_0^\infty \varrho u(u^2 - u_\infty^2)dy$. Part II deals with the flow at

very high thermal conductivity. With rising thermal conductivity (with decreasing Peclet number), the notion of thermal layer becomes less important, and the flow outside the viscous layer is determined by the entire common set of equations for the dynamics of gases for a heat-conducting, yet not viscous gas. At very high - but still finite - thermal conductivity, heat transfer is primarily determined by thermal conductivity. Within infinite ranges also convective transfer is to be taken into account. The author exemplifies the problem of the circulation about a plate parallel to the flow, and the

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temperature T_w which is only slightly different from T_{∞}. There are 2 references, 1 of which is Soviet.

PRESENTED: May 21, 1959, by A. A. Dorodnitsyn, Academician

SUBMITTED: May 15, 1959

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KOGAN, M. N. (Moscow)

"Some Properties of Magnetogasdynamic Flows of Infinite Conductivity."

report presented at the First All-Union Congress on Theoretical and Applied Mechanics, Moscow, 27 Jan - 3 Feb 1960.

S/179/60/000/03/023/039
E031/E413

10.2000 A

AUTHOR: Kogan, M.N. (Moscow)

TITLE: On Shock Waves in Magnetic Hydrodynamics

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Mekhanika i mashinostroyeniye, 1960, Nr 3, pp 143-146 (USSR)

ABSTRACT: In the investigation of plane stationary flows, it is convenient to use the hodograph plane. In Ref 2 and 3 were constructed the characteristic manifolds in this plane and in Ref 4 shock polars were constructed for flows with parallel field and velocity vectors. These shock polars were obtained from the conditions of conservation of mass, impulse and energy of the flow and increase of entropy. Those regimes from the above are found which are stable in accordance with stability conditions which are quoted from Ref 1. Some consideration leads to support for the opinion that fast shock waves are always stable. In the range of Mach number investigated, fast shock waves satisfy the stability conditions. It is shown that instability occurs where the parameters of the flow ahead of the wave correspond on the basis of

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the conservation equations to two or more possible regimes of flow behind the wave. Next the shock wave in a viscous, heat and electricity conducting gas is considered. The heat transfer equation is used to evaluate the thickness of the wave. In the plane case the thickness increases as the intensity diminishes but there is also one type of stable waves whose thickness increases as the intensity increases. There are in fact a number of cases in which the thickness of the shock wave is a significant parameter. There are 3 figures and 4 Soviet references.

SUBMITTED: February 24, 1960

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SOV/40-24-1-14/28

AUTHOR: Kogan, M. N. (Moscow)

TITLE: Plane Flows of an Infinitely Conducting Perfect Gas in a Magnetic Field Not Parallel to the Gas Velocity

PERIODICAL: Prikladnaya matematika i mekhanika, 1960, Vol 24, Nr 1, pp 100-110 (USSR)

ABSTRACT: An analysis and classification of plane magnetohydrodynamic flows is given based on the linearized equations:

$$\rho_0\left(\frac{\partial u}{\partial x}+\frac{\partial v}{\partial y}\right)+V_0\frac{\partial \rho}{\partial x}=0$$

$$\frac{\partial H_x}{\partial x}+\frac{\partial H_y}{\partial y}=0 \qquad (1.2)$$

$$V_0\frac{\partial u}{\partial x}=-\frac{1}{\rho}\frac{\partial p}{\partial x}+\frac{H_{y_0}}{4\pi\rho_0}\left(\frac{\partial H_x}{\partial y}-\frac{\partial H_y}{\partial x}\right)$$

$$V_0\frac{\partial v}{\partial x}=-\frac{1}{\rho_0}\frac{\partial p}{\partial y}+\frac{H_{x_0}}{4\pi\rho_0}\left(\frac{\partial H_y}{\partial x}-\frac{\partial H_x}{\partial y}\right)$$

$$V_0H_y+H_{y_0}u-vH_{x_0}=0, \qquad p=\frac{\gamma p_0}{\rho_0}\rho$$

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for an ideal infinitely conducting gas in a magnetic field H_o perpendicular to the incoming stream. The analysis extends the results of a prior paper (Priklad. matem. i mekh., 1959, Vol 23, Nr 1) in which the magnetic field was taken parallel to the incoming stream. Here, the symbols without zero subscript denote small perturbations in the corresponding quantities at infinity denoted by a zero subscript. V_o is speed of the incoming stream; ρ, density; p, pressure; H, magnetic field; (u,v), velocity. It makes use of formulas giving the inclination (relative to the incoming stream) of shocks of zero intensity derived in the above paper. The author notes that the inclination for arbitrary orientation of H and V can be obtained by a suitable choice of a moving coordinate system. Another distinction is that for H_o parallel to V_o (as in ordinary gasdynamics) the field within the body did not

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influence the flow. Here, the field within cannot be neglected. The field cannot have jumps on the wall, since the resulting currents would imply the existence of a tangential force for an ideal fluid. For hyperbolic flow about a profile (wedge or plate) under zero angle of attack with no magnetic sources in the body, it is shown that a pressure change and turning of the stream occurs in two successive compression shocks or rarefaction waves. It is also shown that an elliptic-hyperbolic flow can develop into two parts: one elliptically damped and the other hyperbolically damped at infinity. Next, the author considers the case when there are body currents perpendicular to the plane of flow. The character of the currents flowing about a plate is discussed (the conducting layer is assumed to be insulated from the stream). In this case, the stream passes through a shock which strongly compresses the gas, after which the gas expands somewhat in a rarefaction wave. When the current gives rise to a transverse component of the magnetic field, the perturbations generated by the

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S/040/60/024/02/24/032

AUTHOR: Kogan, M. N. (Moscow)

TITLE: On the Uniqueness of the Quasi-hyperbolic Flows of Magnetic Hydrodynamics

PERIODICAL: Prikladnaya matematika i mekhanika, 1960, Vol. 24, No. 2, pp. 370-371

TEXT: The author shows that the hyperbolic subsonic flow constructed by him in his former paper (Ref.1) (during the flow towards a thin body by an ideal gas with infinite conductivity in presence of a magnetic field which is parallel with the flow velocity) is the only possible one. In this connection he refers to wrong results in (Ref.4). The author thanks A. G. Kulikovskiy, G. A. Lyubimov, L. J. Sedov and V. V. Sychev for discussions.
There are 2 figures, and 5 references: 2 Soviet, 2 American and 1 French.

SUBMITTED: January 6, 1960

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KOGAN, M.N. (Moskva)

Propagation of perturbations in plane magnetohydrodynamic flows. Prikl.mat.i mekh. 24 no.3:530-536 My-Je'60.

(MIRA 13:10)

(Magnetohydrodynamics)

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AUTHOR: Kogan, M.N. SOV/20-130-2-11/69

TITLE: On the Plane Flow of an Infinite-conducting Fluid With Almost Parallel Vectors of the Magnetic Field and Velocity

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol 130, Nr 2, pp 284-286 (USSR)

ABSTRACT: If $\vec{H} \neq \vec{V}$ holds for a plane flow at infinity, these vectors are not parallel in the entire flow because $[\vec{V}, \vec{H}]$ = const does not hold in the entire flow. $V_t H_n = U_\infty H_{y\infty}$ holds at the boundary of a body (which has no magnetic field sources) about which the above-mentioned fluid flows. V_t denotes the tangential component of the velocity vector and H_n the normal component of the field strength. U_∞ is the velocity of the flow running along the x-axis, and $H_{y\infty}$ is the component of the magnetic field along the y-axis. The afore-mentioned equation leads to two conclusions: 1) $H_n \neq 0$ on the surface of the body. Consequently, there are no surface currents on the surface of the dielectric.

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On the Plane Flow of an Infinite-conducting Fluid With Almost Parallel Vectors of the Magnetic Field and Velocity SOV/20-130-2-11/69

2) $H_y \to \infty$ holds for the approach toward the critical point ($v_t \to 0$). The author investigated a new type of a boundary layer that is connected with the first of the afore-mentioned conclusions. It occurs on the surface of the bodies with almost parallel velocity vector and field vector (i.e., with small $\varepsilon = H_{y\infty}/H_{x\infty}$) in the case of a plane flow of a perfect, infinite-conducting fluid. Each flow may be subdivided into two main types, i.e. into a flow (with parallel field- and velocity vector) that differs but little from the flow for $\varepsilon = 0$, and into a flow inside the boundary layer. The regions near the critical points are singular. The flow is defined by the following equations: $\frac{\partial u}{\partial x} + \frac{\partial v}{\partial y} = 0$, $\frac{\partial H_x}{\partial x} + \frac{\partial H_y}{\partial y} = 0$, $u\frac{\partial u}{\partial x} + v\frac{\partial u}{\partial y} = -\frac{1}{\varrho}\frac{\partial p}{\partial x} + \frac{H_y}{4\pi\varrho}\left[\frac{\partial H_x}{\partial y} - \frac{\partial H_y}{\partial x}\right]$; $u\frac{\partial v}{\partial x} + v\frac{\partial v}{\partial y} = -\frac{1}{\varrho}\frac{\partial p}{\partial y} + \frac{H_x}{4\pi\varrho}\left[\frac{\partial H_y}{\partial x} - \frac{\partial H_x}{\partial y}\right]$; $uH_y - vH_x = H_{y\infty}U_\infty$. $p + H_x^2/8\pi$ is

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On the Plane Flow of an Infinite-conducting Fluid With Almost Parallel Vectors of the Magnetic Field and Velocity SOV/20-130-2-11/69

constant in a transverse position to the layer. The authors then proceed to independent variables, and the computation is followed step by step. With $v = \partial \Phi/\partial \chi$ and $H_y = -\partial \Phi/\partial \psi$ one obtains $u \frac{\partial \Phi}{\partial \psi} + h_x \frac{\partial \Phi}{\partial \chi} = -H_{y\infty} U_{\infty}$. The solution of this equation is not very difficult after the determination of u and H_x. With the help of the formulas $d_x = \frac{1}{H_{y\infty} U_{\infty}} (u d\chi - H_x d\psi)$; $dy = \frac{1}{H_{y\infty} U_{\infty}} (v d\chi - H_y d\psi)$ it is possible to proceed to the physical surface. $d\psi = -\frac{1}{H_0(x)} dx$ holds along the boundary line χ=const. H_0 denotes the function value obtained from the solution of the outer problem. Over a wide region of the boundary layer it is possible to determine $H_0(x)$ and $u_0(x)$ with sufficient accuracy from the solution for $\varepsilon = 0$. Therefore, this region requires a special investigation. There are 1 figure and 2 Soviet references.

PRESENTED: July 9, 1959, by A.A. Dorodnitsyn, Academician

SUBMITTED: June 30, 1959

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KOGAN, M. N.

Doc Phys-Math Sci - (diss) "Magnetohydrodynamic courses of ideal gas with unlimited electrical conductivity." [Moscow], 1961. 6 pp; (State Committee of the Council of Ministers USSR for Aviation Techniques, Central Aero-hydrodynamic Inst imeni Prof N. Ye. Zhukovskiy); number of copies not given; price not given; (KL, 7-61 sup, 217)

KOGAN, M.N. (Moskva)

Resistance of bodies similar to bodies of revolution. Inzh. zhur. 1 no.3:156-158 '61. (MIRA 15:2)
(Aerodynamics)

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B125/B204

AUTHOR: Kogan, M. N. (Moscow)

TITLE: The magnetohydrodynamic flows of mixed type

PERIODICAL: Prikladnaya matematika i mekhanika, v. 25, no. 1, 1961, 132-137

TEXT: The present paper shows that in magnetohydrodynamics, several types of mixed flows exist. These flows may be described either by the equation by Tricomi $\varphi_{yy} - y\varphi_{xx} = 0$ as well as by the equation $\varphi_{xx} - y\varphi_{yy} = 0$ differing from the former considerably. In the present paper, various types of mixed flows are studied, and for each of them, the corresponding equations and similarity rules are derived. If the flow has the same direction as the x-axis, then the following equations of the magnetohydrodynamics of an ideal gas are obtained:

$$(1 - M^2)\frac{\partial V_x}{\partial x} + \frac{\partial V_y}{\partial y} = 0, \quad \left[M^2(1 + N^2) - N^2\right]\frac{\partial V_x}{\partial y} - (M^2 - N^2)\frac{\partial V_y}{\partial x} = 0 \quad (1.5)$$

These equations change their type if only one of the coefficients passes

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through zero. This holds also with $M = 1$, $M = N$, and $M = N\sqrt{1 + N^2}$. The character of the transition $M = 1$ and $M = N$ is different according to wether $N > 1$ or $N < 1$ holds. Also the case $M = N = 1$ is of interest. The author discusses these six cases. $N^2/M^2 = (N^2/M^2)_0(\varrho/\varrho_0)$ holds, where $(N^2/M^2)_0$ is the limit of the ratio N^2/M^2 where $M \to 0$ and ϱ_0 denote the limiting density. With $(N^2/M^2)_0 < 1$ only the transition at $M = 1$ and $N < 1$ is possible. This transition is qualitatively similar to the sound-near transition of classical hydrodynamics, which has been studied in the papers by F. I. Frankl', S. V. Fal'kovich, Guderley and other authors. New types of mixed flows may occur only with $(N^2/M^2)_0 > 1$, i.e. in the case of high magnetic energy density. The quantities marked by an asterisk relate to points with $M = 1$, quantities with two asterisks to points with $M = N/\sqrt{1 + N^2}$, quantities with the index ^{0} to points with $M = N$, in which the velocity equals Alfvèn velocity: $V = V^0$. The second section of the present paper deals with the flow near the line $M = M_{**}$. Here,

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$V_x = V_{**}(1 + u)$ and $V_y = V_{**}v$ is put, where u and v are small quantities. By some substitutions and, using a Legendre transformation, for this case the equation $\Psi_{\xi\xi} - \xi\Psi_{\eta\eta} = 0$ is obtained. With $\xi > 0$ all characteristics are real, and the equations are hyperbolic. The boundary lines of the flow may occur in the hyperbolic case. As a simple example, a flow of the mixed type, which is under investigation, is calculated. Further, the similarity law for the investigated flows is given. For the Alfvèn-like flows, one finds in the same manner $\psi_{yy} - \psi_y\psi_{xx} = 0$, $\Psi_{\eta\eta} - \xi\Psi_{\xi\xi} = 0$, and for the sound-near velocities $u\left[(\varkappa + 1)y_{vv} - y_{uu}\right] + y_u = 0$ holds. The flows of mixed type investigated here may occur under the following conditions: 1) With $(N^2/M^2)_0 < 1$ there is only one region of mixed flows near the sound line in the nozzle. This flow is qualitatively similar to the sound-near flows of ordinary gas dynamics. 2) With $(N^2/M^2)_0 < \varrho_0/\varrho_*$, there exist, in addition to the sound-near transition of the ordinary

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type also the transitions already investigated in parts 2 and 3 at $M = N/\sqrt{1 + N^2}$ and $M = N$, which bound the hyperbolic subsonic range. 3) With $(N^2/M^2)_0 > \rho_0/\rho_*$, the hyperbolic subsonic range extends from $M = N/\sqrt{1 + N^2}$ up to the sound line, where the transition to the elliptic supersonic flow occurs. The elliptic supersonic range ends at the Alfvèn-near transition to the hyperbolic flow. 4) With $(N^2/M^2)_0 = \rho_0/\rho_*$ the transition from the elliptic to the hyperbolic flow occurs at $M = N\sqrt{1 + N^2} < 1$. All flows at high velocities are hyperbolic with a parabolic degeneration on the sound line. There are 5 figures and 1 Soviet-bloc reference.

SUBMITTED: September 14, 1960

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D201/D302

AUTHOR: Kogan, M.N. (Moscow)

TITLE: On spatial magneto-hydrodynamic flow

PERIODICAL: Prikladnaya matematika i mekhanika, v. 25, no. 2, 1961, 375 - 376

TEXT: In this article the case of two surfaces of hyperbolic flow are considered. The linearized equations for an ideal infinitely conducting gas with a magnetic field parallel to the field velocity have the form

$$(1-M^2)\frac{\partial v_x}{\partial x}+\frac{\partial v_y}{\partial y}+\frac{\partial v_z}{\partial z}=0 \qquad \left(M=\frac{V_0}{a_0}\right)$$

$$[M^2-N^2(1-M^2)]\frac{\partial v_x}{\partial y}-(M^2-N^2)\frac{\partial v_y}{\partial x}=0 \qquad \left(N=\frac{V_a}{a_0}\right) \qquad (1)$$

$$[M^2-N^2(1-M^2)]\frac{\partial v_x}{\partial z}-(M^2-N^2)\frac{\partial v_z}{\partial x}=0 \qquad \left(V_a=\frac{H_0}{\sqrt{4\pi\rho}}\right)$$

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where v_x, v_y, v_z are the perturbed velocities, V_0 the flow velocity, V_a Al'fven's velocity, H_0 the unperturbed magnetic field and ρ_0 the density. For the perturbed field

$$\frac{h_x}{H_0} = (1 - M^2)\frac{v_x}{V_0}, \quad \frac{h_y}{H_0} = \frac{v_y}{V_0}, \quad \frac{h_z}{H_0} = \frac{v_z}{V_0} \tag{2}$$

Transforming by means of

$$v_x = \frac{M^2 - N^2}{M^2 - N^2(1 - M^2)} v_x^-, \quad v_y = -v_y^-, \quad v_z = -v_z^-, \\ x = -x^-, \quad y = y^-, \quad z = z^- \tag{3}$$

gives

$$\frac{\partial v_y^-}{\partial z^-} - \frac{\partial v_z^-}{\partial y^-} = \left(\frac{\partial v_z}{\partial y} - \frac{\partial v_y}{\partial z}\right) = \frac{V_0}{H_0}\left(\frac{\partial h_z}{\partial y} - \frac{\partial h_y}{\partial z}\right) = F(y, z)$$

where in the general case $F(y, t) \neq 0$. From a consideration of these equations, the author deduces that in the quasihyperbolic

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case with vortex motion, the problem cannot be treated within the framework of the theory of an ideal gas. In conclusion the author thanks A.A. Doroshintsin, and V.V. Sychev for their help. There are 1 figure and 1 Soviet-bloc reference.

SUBMITTED: January 2, 1961

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25473
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AUTHOR: Kogan, M. N.

TITLE: Conservation of vortices and currents in magnetohydrodynamics

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 139, no. 1, 1961, 58 - 59

TEXT: It is known that the conservation theorems on hydrodynamics established by Thomson are not applicable to magnetohydrodynamics. Here is furnished proof of a statement that has an analogous meaning in magnetohydrodynamics as have the above theorems in the field of hydrodynamics. Subject of investigation is the flow of an incompressible infinitely well conductive liquid. It is assumed that the liquid disturbances are minimal, that is, the quantities $\vec{V} - \vec{V}_o$ and $\vec{H} - \vec{H}_o$ and their derivatives are small, so that the squares of these quantities can be neglected. $\vec{V}$ and $\vec{H}$ stand for the flow vector and magnetic field vector, respectively. The subscript zero refers to the undisturbed flow. Introducing the Alfvén-velocity $\vec{A} = \vec{H}/\sqrt{4\pi\varrho}$, an arbitrary contour moving either at the velocity $\vec{V}_o + \vec{A}_o$ or $\vec{V}_o - \vec{A}_o$ is examined. The following theorem can

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be formulated for this contour: in a weakly disturbed incompressible liquid exhibiting an infinite conductivity the circulation of the vector $\vec{V} + \vec{A}$ over an arbitrary contour moving at the velocity $\vec{V}_o \pm \vec{A}_o$ will be constant. This theorem is verified as follows: for a contour moving at the velocity $\vec{V}_o - \vec{A}_o$,

$$\frac{d}{dt}\oint (V + A, dr) = \oint \left(\frac{d}{dt}(V + A), dr\right) \quad \left(\frac{d}{dt} = \frac{\partial}{\partial t} + (V_0 - A_0, \nabla)\right). \qquad (1)$$

is valid. Upon introducing the Alfvèn velocity the motion and induction equations can be put down as follows:

$$\frac{\partial V}{\partial t} + (V_0, \nabla) V = -\operatorname{grad}\left(\frac{p}{\rho} + \frac{A^2}{2}\right) + (A_0, \nabla) A, \qquad (2)$$

$$\frac{\partial A}{\partial t} + (V_0, \nabla) A = (A_0, \nabla) V, \qquad (3)$$

By addition one has

$$\frac{d(\mathbf{V}+\mathbf{A})}{dt} = -\operatorname{grad}\left(\frac{p}{\rho}+\frac{A^2}{2}\right). \qquad (4)$$

By substituting (4) into (1) it is shown that the theorem is correct with $\vec{V}_0 - \vec{A}_0$. An expression

$$\frac{d(\mathbf{V}-\mathbf{A})}{dt} = -\operatorname{grad}\left(\frac{p}{\rho}+\frac{A^2}{2}\right) \quad \left(\frac{d}{dt}=\frac{\partial}{\partial t}+(\mathbf{V}_0+\mathbf{A}_0,\nabla)\right). \qquad (5)$$

analogous to (4) is obtained which proves the theorem for a contour moving at the velocity $\vec{V}_0 + \vec{A}_0$ to be correct. This result can also be represented in another form. Applying the curl operator to (4) and (5)

$$\frac{\partial\vec{\omega}_1}{\partial t}+(\mathbf{V}_0-\mathbf{A}_0,\nabla)\,\vec{\omega}_1=0,\quad \frac{\partial\vec{\omega}_2}{\partial t}+(\mathbf{V}_0+\mathbf{A}_0,\nabla)\,\vec{\omega}_2=0, \qquad (6)$$

is obtained, where $\vec{\omega}_1$ = curl $(\vec{V}+\vec{A})$ and $\vec{\omega}_2$ = curl $(\vec{V}-\vec{A})$. From this can be seen that in magnetohydrodynamics curl $(\vec{V}+\vec{A})$ moves relatively to the liquid at the velocity $-\vec{A}_0$ and curl $(\vec{V}-\vec{A})$ at the velocity $\vec{A}_0$ relatively to the liquid. Contrary to hydrodynamics there are thus two possible displacement directions for vortices. The result offers an explanation of the mechanism of formation of tracks and vortex rings which originate with the motion of a body in a liquid. To include, the motion of a body in a viscous liquid of a finite conductivity is investigated. It is evident that the vortices originating around the body will move in the above mentioned directions. Viscosity and conductivity of the liquid, however, will change these directions in a way demonstrated in Fig. 1. There are 1 figure and 1 non-Soviet-bloc reference. The reference to the English-language publication reads as follows: H. Yosinobou, J. Phys. Soc. Japan, 15, no. 1, (1960)

PRESENTED: February 23, 1961, by A. A. Dorodnitsyn, Academician

SUBMITTED: February 23, 1961

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KOGAN, M.N. (Moskva)

Mixed magnetohydrodynamic flows. Prikl. mat. i mekh. 25 no.1:132-137 Ja-F '61. (MIRA 14:6)

(Magnetohydrodynamics)

KOGAN, M.N. (Moskva)

Simple exact solution of equations in magnetohydrodynamics. Inzh.-zhur. 1 no.2:152-154 '61. (MIRA 14:12)
(Magnetohydrodynamics)

KOGAN, M.N. (Moskva)

Spatial magnetohydrodynamic flows. Prikl. mat. i mekh. 25 no.2: 375-376 Mr-Ap '61. (MIRA 14:5)
(Magnetohydrodynamics) (Gas flow)

KOGAN, M.N.

Conservation of vortices and currents in magnetohydrodynamics.
Dokl. AN SSSR 139 no.1:58-59 Jl '61. (MIRA 14:7)

1. Predstavleno akademikom A.A. Dorodnitsynym.
(Magnetohydrodynamics) (Vortex motion)

38091
S/040/62/026/003/014/020
D407/D301

17.4300
10.3100

AUTHOR: Kogan, M.N. (Moscow)

TITLE: On hypersonic flow of a rarefied gas

PERIODICAL: Prikladnaya matematika i mekhanika, v. 26, no. 3, 1962, 520 - 529

TEXT: Hypersonic flow, close to free-molecule flow, is considered. The presence of molecular processes was established, which permit calculating the flow, taking into account the first intermolecular collisions only (even if one of the characteristic lengths is much smaller than the linear size of the body). It is shown that under certain conditions, at large Reynolds numbers, a thin molecular boundary-layer is formed near a plate which is at zero (or small) angle of attack. In general, the effective collision cross-section of molecules σ decreases with increasing relative velocity c^0. In order to illustrate the dependence of σ on c^0, two characteristic cases are considered: σ = const., and σ is inversely proportional to the relative velocity. Hypersonic flow past a plate with characteristic length L is considered; first, it is assumed that the plate is per-

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pendicular to the flow. The mean velocity of the reflected molecules is determined by the temperature of the wall T_W and the accomodation coefficient α. In this case, the principal dimensionless flow-parameter is the ratio $M_2 = V_\infty/V_2$ (V_∞ denoting the velocity of the oncoming flow and V_2 the mean velocity of the reflected molecules). It is assumed that $M_2 \gg 1$ and $\sigma = \sigma_\infty$ = const. In order to obtain the first correction to free-molecule flow, it is sufficient to make allowance for the first collisions only. Denoting by N_-, P_- and Q_-, the decrease in the number of particles, momentum and energy, due to the collisions, one obtains

$$N_- \sim N_0 n_2 \sigma L \sim N_0 M_2 K^{-1}, \quad P_- \sim N_- mV_\infty, \quad Q_- \sim N_- mV_\infty^2, \qquad (3.4)$$

where K is Knudsen's number. Further, it is assumed that σ is inversely proportional to the relative velocity, while (as before) $M_2 \gg 1$. Then, the cases: $M_2 \sim 1$, σ = const., and $M_2 \sim 1$, σ inversely proportional to the velocity are considered. It was found that, depending on the conditions the similitude criteria change: from K/M (in the case $M_2 \gg 1$, σ = const.) to MK (in the last case), i.e. by M^2 times. The boundary of free-molecule flow shifts in accordance with these criteria: in the first case, free-molecule flow is realized (at same Mach number) at much greater altitude than in the last case ($M_2 \sim 1$, σ inversely proportional to the velocity). Further, hypersonic flow past a plate at zero angle of attack is considered. It was found that the density of the molecules in the boundary layer increases until the leakage at the ends of the layer compensates the inflow of molecules. The calculation of hypersonic flow past a plate, at Knudsen numbers from $K \gg M$ to $K^2 \gg M \gg K$ (from $R \gg 1$ to $\sqrt{M} \gg R \gg 1$), can be performed with allowance for the first intermolecular collisions, regardless of whether one of the characteristic lengths λ is commensurate or even much smaller than the characteristic dimension of the body. At even larger Reynolds numbers, it is necessary to take into account the second, third, etc. collisions. The process of "conversion" of reflected molecules into molecules with large free-path, was established. It was observed that the curve of drag and heat transfer as a function of K, has a maximum. The drag (heat-transfer) is, at an angle of attack $\vartheta = 90^\circ$ smaller than, and at zero angle of attack, larger than, in the case of free-molecule flow. Further, hypersonic flow past a plate at arbitrary angle of attack, is considered, as well as flow past a cone. In both cases it was found that,

On hypersonic flow of a rarefied gas S/040/62/026/003/014/020
D407/D301

at small angles of attack, the drag is larger than in the case of free-molecule flow.

SUBMITTED: February 26, 1962

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24,4300

S/020/62/144/006/008/015
B108/B102

AUTHOR: Kogan, M. N.

TITLE: Reversibility theorem for a nearly free molecular current

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 144, no. 6, 1962, 1255-1257

TEXT: The effect of interaction between molecules incident upon and reflected from an arbitrary plate and the number of particles, energy and momentum falling upon this plate is considered. All characteristic mean free paths of the molecules are assumed to be greater than the characteristic size of the plate. The distribution both of the incident and of the reflected particles near the plate can then be regarded as in a free molecular beam. The change in the k-th property of the beam owing to collision of the particles can be described by a function $\vec{W}^k_{ij}(x_i-x_j, y_i-y_j)$ such that the entire change in this property is $\iiiint \vec{W}^k_{ij} ds_i ds_j$ to be integrated over the whole plate. The same holds

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Reversibility theorem for a...

for the reflected beam in which number of particles, energy and momentum have to be conserved. Only the first collisions of the particles need be considered. These features have an effect on the aerodynamic characteristics of the plate. There is 1 figure.

PRESENTED: February 3, 1962, by A. A. Dorodnitsyn, Academician

SUBMITTED: January 30, 1962

√B

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KOGAN, M.N.

Reversibility theorem for nearly free-molecular flows. Dokl. AN SSSR. 144 no.6:1255-1257 Je '62. (MIRA 15:6)

1. Predstavleno akad. A.A.Dorodnitsynym.
(Gas flow) (Molecular dynamics)

KOGAN, M.N. (Moskva)

Load symmetry along airfoils of minimum resistance. Inzh. zhur. 1 no.4:132 '61. (MIRA 15:4)
(Airfoils)

KOGAN, M.N. (Moskva)

Hypersonic flows of a rarefied gas. Prikl. mat. i mekh. 26 no.3: 520-529 My-Je '62. (MIRA 16:5)

(Hypersonics) (Gas flow)

APPT ... E3L-3--Pd-4

... calculating the distribution f(t,x sub i, X ...), where x ... cartesian coordinates and Y ...

ATION:

DATE ACQ:

NO REF SOV:

KOGAN, M.N. (Moscow)

"Dynamics of rarified gas".

report presented at the 2nd All-Union Congress on Theoretical and Applied Mechanics, Moscow, 29 Jan - 5 Feb 64.

APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000723610016-5"

CHEBOTAREV, D. N., KOGAN, M. O. Engs.

Ditches

Use of stock material for bracing ditches. Stroi. prom. 30 no. 5, 1952

Monthly List of Russian Accessions, Library of Congress, September 1952. UNCLASSIFIED.

KHESIN, M.I.; MEL'NIK, S.M.; KOGAN, M.S.

Paste for discoloring dyes on the skin. Vest. derm. i ven. 37 no.2:85-86 F'63. (MIRA 16:10)

1. Iz zavoda khimicheskikh reaktivov, Khar'kov.

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APPROVED FOR RELEASE: 09/18/2001 CIA-RDP86-00513R000723610016-5"

5(1,3)

AUTHORS: Blokh, G. A., Kogan, M. S., Bogdanovich, N. A., Bol'shakova, Z. N., Tyuremnova, Z. D.

SOV/153-58-6-18/22

TITLE: On the Stability in Water of the Petroleum and Benzene-resistant Rubbers (Ob ustoychivosti k vode maslobenzostoykikh rezin)

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i khimicheskaya tekhnologiya, 1958, Nr 6, pp 101-107 (USSR)

ABSTRACT: The rubbers mentioned in the title get into contact as well with water at normal and at raised temperatures under operational conditions beside the substances to which they are resistant. A particular shortcoming of the rubber products for special use (butadiene nitryl- and chloroprene rubber) in operation is their low stability in water. They swell up to 3-5% at normal temperatures and up to 7-9% at 100°. In consequence of this water penetrates e.g. into cables. In the present investigation the action of the following factors upon the stability in water of the rubbers mentioned in the title was investigated: a) vulcanization conditions (duration, temperature), b) substitution of the hydrophilic components

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